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ABSTRACT

The history and accomplishments of the Arizona Center for Early Childhood Education from its founding in 1966, as a component of the National Laboratory on Early Childhood Education, to its reorganization in 1972, as the Arizona Center for Educational Research and Development, are presented. The Arizona Center originated with a commitment to the systematic analysis, continued development, validation and modification of a new, existing program. The Tucson Early Education Model was a 3-year program on the intellectual development of young Mexican-American children, conducted in response to a high rate of school dropouts. A new educational program was evolved and gradually implemented in 68 classrooms, grades 1-3, in eight Tucson public schools. Four instructional goal areas were emphasized: (1) language development, (2) intellectual base, (3) motivational base, and (4) societal arts and skills. Initial research efforts of the Arizona Center attempted to study the effects of basic learning variables associated with the Tucson Early Education Model, such as modeling and discrimination. These studies later led to a formalized program of research, comprising three basic areas of study: (1) intellectual skills, (2) environmental influences, and (3) instructional methods and techniques. In the area of intellectual skills, sequential memory ability was shown to be influenced by stimuli grouping. In the environmental area, influences of socialization on intellectual performance were investigated. The concluding section, on research-practice interaction, covers curriculum evaluation, open classrooms, parent child training and models for educational decision making. (BF)

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ARIZONA CENTER
FOR EARLY CHILDHOOD EDUCATION
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FINAL REPORT
ARIZONA CENTER FOR EARLY CHILDHOOD EDUCATION

1966 - 1972

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FINAL REPORT

ARIZONA CENTER FOR EARLY CHILDHOOD EDUCATION

1966 - 1972

The purposes of this report are to detail the history and the accomplishments of the Arizona Center for Early Childhood Education. The Arizona Center for Early Childhood Education was initially funded as a component of the National Laboratory on Early Childhood Education in December 1966. Since that time the Center has expanded the scope of its operations and other funded projects have been incorporated into its structure. As new research, development and evaluation capabilities developed in the several components which came to comprise the Arizona Center, a decision was made to expand the base of the Arizona Center for Early Childhood Education to enable this organization to pursue research and development activities beyond the scope of early childhood while continuing those activities related to the education and development of young children. This report covers the period from the initiation of the Arizona Center for Early Childhood Education in 1966 up to the point of its reorganization under the new title, The Arizona Center for Educational Research and Development, in the summer of 1972.

I. THE DEVELOPMENT OF NEW EDUCATIONAL PROGRAMS: CHALLENGE AND STRATEGY

For the first time in our history we must regard education with total seriousness. Just as we now realize that failure to produce food for all threatens every man, so are we beginning to see that failure to educate will underlie great human disaster. Much as the food demand exceeds our productive and distributive capacities, so do the complex and technical requirements of modern society exceed our educative capacity. It is now possible to die from lack of education. The critical examination of the educative process has taken on a new urgency. No longer is the development of new programs one merely of academic and scientific interest. Rather, educational processes are the focus of national concern and the principal hope of vast numbers of people. No longer can education be a bureaucratic institution or a system of knowledge dissemination. Rather, it must be a process of intervention designed to counter a growing threat to our national survival.

The view that new educational program is a system of intervention raises several questions. The most obvious is, "in what does educational innovation intervene?" A growing battery of evidence convinces us that the present system for educating the people of this nation fails with large segments of the population. In addition, with recognition that the process of education is not separate from the processes of child rearing and the management of extraschool environments, we begin to recognize the need to evolve change in many segments of our culture. Serious questions concerning rights of decision, locus of control, and the establishment of goals must be faced by those implementing educational intervention.

There is little agreement about the best ways to redesign the educational process. In general, there are two current tactics, both of which presume to make use of scientific research to establish sound educational program. One strategy emphasizes the role of careful scientific inquiry to establish a sound data basis on which to implement educational change. Do the research first and then change the system is the order of this view. Practitioners of the procedure begin with research and suggest that at a future date curriculum be built in a mosaic fashion on the basis of research findings. The advantage of this approach is that it minimizes the risk of innovations which do not prove to be improvements in the long run. The disadvantage is that much of education program remains traditional and unchanged in spite of dissatisfaction with it. The establishment of research data is a slow and laborious process and the length of time between the production of research findings and educational change is notoriously long. The opposite strategy is to modify educational program on the basis of previous experience, best guesses, new philosophy, and available data and then set about the task of verifying and modifying on the basis of research findings. Change the system and then do the research is the order of this strategy. The advantage here is that the unsuccessful systems are discarded.

The principal difference in the two tactics is the rate at which they implement change. Though the fast-change point of view appears to get results, in the long run it may not do so and the two approaches may not differ much in efficiency. In both strategies, the process of establishing the effectiveness of a procedure tends to be separate from the process of implementing the procedure.

II. THE FOCUS OF THE ARIZONA CENTER

The Arizona Center for Early Childhood Education originated with a commitment to the systematic analysis, continued development, validation and modification of a new and existing educational program. This program involved goals and methods of instruction different from traditional education and represented a significant change in educational procedures. It was the purpose of this center to evaluate these innovations and to evolve a research base to guide the future evolution of the early education program. In terms of the strategies described above for the implementation of educational change, the work of the Arizona Center began with a major change in program.

The rationale for relating the work of such a center to an existing educational program is based on the recognition that educational research is embedded in a context of national need and urgency. Educational program must be designed and implemented even though a scientific basis for all decisions is lacking because education is a crucial and ongoing enterprise. All research data to be meaningful must be related to a program which has been developed on several nonscientific bases. We recognize, for example, new cultural skills and attempt to build educational programs which will develop these skills although we lack the scientific and precise knowledge about the best way to produce them. We recognize the failure of traditional programs to teach behaviors necessary in a complex and technical environment and attempt to innovate a program which will best serve these ends. Again the recognition of the need preceeds the scientific examination of the means. In addition, much of education is based upon

the experience of educators. Although this experience is often expressed in imprecise, subjective and personalized ways, there is no a priori basis for assuming that the accumulated experience of educators is not an important contribution to the development of program. If we are to have educational program at all, then scientific research data can be only one part of the foundation for its establishment and evolution.

At the same time, however, research within the context of an educational program is the most important basis for change and growth of the program. The principal strategy of the work at Arizona has not been to test the efficacy of the toal program in order to reject or accept it. Rather, the plan has been to analyze important components of the program, to modify components as the data dictate, and to build a program whose validity is based on the validity of its components. Educational program, to be viable , must constantly be open to research input. As such it is never complete and can only be represented in terms of its current status. Research and the process of change must be part of the total operation of educational program.

Advantages

There are several advantages to focusing research and development on an existing educational model. The existence of the model reminds the researcher that his data must eventually be given prommatic meaning. It is a common lament that research findings are often left in obscure and irrelevant forms. Researchers tend to publish their findings in their own professional journals which do not find their way into the hands of the classroom teacher. Beyond that however, the findings are often presented in

such a way that their meaning for the educational process is obscure. This is not to say that all educational research should be of an applied nature. It is to say, however, that the research thrust should be maintained to the point that the findings take on relevance for educational program. When work is aimed at an existing and defined program, the parameters of the task become clear. The researcher begins to see what will be necessary before his research can take on relevance for education. In addition, the processes and techniques of translating research findings into meaningful pieces of information for the educator can themselves be examined.

The existence of a defined educational program can also guide the selection of research problems and the focus of resources. Most educational programs contain such a wide array of research needs that almost any researcher can find some point at which the needs of the program and his particular research interest are congruent. It is also easier for the researcher working within the framework of an educational program to become aware of the actual needs and problems in the field. Thus, those responsible for implementing educational program can become aware of research as a tool and as a process which produces products useful to them. This relationship between the program needs and the research efforts paves the way for closing the gap between research and implementation. It also means that the rate of incorporation of research and development findings and products into an actual educational enterprise is greatly increased. One recent estimate suggests that the time lag between the development of a significant innovation and its incorporation in education may be as great as 50 years.

Another advantage in relating research to existing educational program is the fact that research methodology can make significant contributions to teaching and instructional skill. In a sense, the teacher is a researcher. Many teachers work at developing new ways of working with a particular child or groups of children, of presenting problems and materials, and of organizing their classrooms. Research strategy has much to contribute to the individual teacher's design and evaluation of his teaching strategies. Further, the technology of research can often contribute to the technology of teaching.

Finally, it is only in the context of educational programs that such issues as teacher training and the dissemination of educational change can become research topics.

Disadvantages

The primary disadvantage of relating research program to ongoing educational program is the fact that educational change in itself takes tremendous amounts of time and energy. A group of researchers wishing to implement significant educational change may find most of their time consumed with training, demonstration, consulting and disseminating the program and very little of their time available for the design and implementation of the research. It is clear that if significant changes in American education are to be made and evaluated, then adequate support must be provided for both endeavors. The service demand is a particularly strong one and can frequently take precedence over the research requirements. Only when both the implementation and research thrusts ean be realized will there be availabel at any given moment an educational program of real utility and relevance which will reflect the most current contributions of research and development.

III. THE TUCSON EARLY EDUCATION MODEL: AN EDUCATIONAL PROGRAM FOR YOUNG CHILDREN

History

The Tucson Early Education Model began in 1965 as a three-year cooperative project on the intellectual development of young Mexican-American children conducted by the University of Arizona represented by Dr. Marie M. Hughes and Tucson District No. 1 represented by Mrs. Jewell Taylor. There were several factors which led to the development of this project. First, the school superintendent's committee on dropouts reported that Mexican-Americans as a group had the highest rate in Tucson for leaving school before the 12th grade. Second, test results in reading and social studies indicated that the discrepancy between the achievement of young Mexican-American children and their Anglo-American counterparts increased as they progressed through school. Actually Mexican-American first and second graders were nearer the norm of their Anglo-American counterparts than they were in the middle grades. At the sixth grade they were, as a group, one and one-half to three years below the test norms.

In general, the data on the Mexican-American child's progress in schools in the Southwest were similar to those data for certain other groups of children; namely, minority groups, the rural poor, and others that were from families of unskilled parents living close to a subsistence level.

The new educational program as it evolved was gradually implemented in 68 classrooms, grades one through three in eight public schools in the metropolitan Tucson area. The continued elaboration and evaluation of this model became the focus of the Arizona Center for Early Childhood Education at the University of Arizona in 1967. In 1968 the Arizona Center was asked

to sponsor new Early Education Programs for Project Follow Through in fourteen communities throughout the nation. In 1969 the number of communities increased to nineteen.

While the Tucson Early Education Model has played an important and continuing role in the activities of the Arizona Center for Early Childhood Education, from 1970 to the present most of these activities have been supported by a Follow Through Implementation Project. During this same period researchers working under the auspices of the National Program on Early Childhood Education began to search for ways of better specifying the elements of open and flexible programs for young children with a view to developing more effective and accountable procedures for program implementation. The characteristics of the Tucson Early Education Model are detailed in this section of this report. Section IV describes the most recent programs of research conducted under NPECE auspices, and preliminary efforts to develop an analytic instructional model for the early elementary grades.

Instructional Goals

The major emphasis in the initial development of the Tucson Early Education Model was on the instructional program. Components for parent involvement and psychological services were added in 1969. Four instructional goal areas were emphasized in the instructional program.

1. Language Development

Language competence is one of the major technical skills of the culture to which the child must adapt. Critical information is transmitted

principally in verbal form. This requires an acquaintance with a variety of linguistic labels, concepts, language and communication forms, and an awareness of the function of language. The study of language, the development of research instruments and data, and the development of curriculum materials for language constituted an important thrust of Center activities.

2. Intellectual Base

The intellectual base is a collection of skills assumed to be necessary in the process of learning. These skills are as yet only partially recognized and defined and are usually not formally taught in traditional educational programs. Yet, the importance of these skills in every learning process is becoming increasingly recognized. We are beginning to suspect that the success of the child in the educational process is dependent upon his acquisition of several basic intellectual skills. It is hypothesized that these skills may be learned by many children largely outside the classroom. Consider, for example, the learning of learning skills. If a teacher gives a young child a list of words to take home to learn to spell, the child is put in the position of having to teach himself. If he has at home parents who are willing to read the words to him or show him how to write out the words and check them against the list or sibling who is willing to show him how to go about the task of learning, he will learn the words. If he does not have these resources outside of the classroom, he may indeed fail to teach himself. It is clear that as a child progresses through the educational system, he is given greater responsibilities for teaching himself. At the same time the traditional educational system does not systematically teach children the skills of self-teaching or learnign how to learn.

Some of the intellectual base skills involve the conceptual organization of stimuli in the environment. For example, ordering events along certain dimensions such as size, color, and form or sequencing events according to time. Some intellectual base skills are complex behaviors which are difficult to define: to be able to attend, to recall significant events, to be able to organize one's behavior toward specific goals, to evaluate alternatives, to choose, to plan, to develop expectations, to be able to discriminate significant and important behaviors in others, and to imitate. A goal of the Tucson Early Education Model has been to make these behaviors an explicit part of the instructional goals. It is necessary to identify and teach systematically these crucial behaviors the acquisition of which has traditionally been left to chance.

3. The Motivational Base

The motivational base is a collection of attitudes and behavioral characteristics related to productive social involvement and learning. These include attitudes toward school and toward the learning process, a willingness to persist at learning tasks and to take on new problems, appreciation for learning and expectation of success and a willingness to change. In addition, there are the important attitudes toward self such as confidence, expectations of success, standards of work, and finally a consistent picture of oneself as one who can learn. It is assumed that these characteristics can be taught. An important aim of the Tucson Early Education Model has been to make them formal curriculum goals and to develop the techniques of developing these characteristics in the young child.

4. Societal Arts and Skills

Our culture is characterized by a wide range of arts and skills which constitute social interaction, information transmission, and scientific advance. Here are classified reading, writing, arithmetic, and other mathematic skills as well as the social skills of cooperation and democratic process. This collection of skills has been the traditional focus of Early Education Programs. It should be noted that in the Tucson Early Education Model, they constitute only one portion of the curriculum goals.

Principles of the Instructional Program

c The purpose of the instructional program is to structure about the child a learning environment designed to promote the development of the behaviors defined by the goal areas. Several program processes have been identified which serve to focus the research and development aspects of Center activity.

1. Basic Learning Variables

a. Imitation Although imitation is widely recognized as a significant process by which the young child acquires new and complex behavior, it is seldom formally incorporated into classroom practice. In the Tucson Early Education Model teachers have been trained in the use of modeling as a technique for facilitating the development of skills and abilities. Imitation is a particularly important process in the acquisition of language in the classroom. Adults consciously and continuously work to model elaborated and extended examples of the child's own communications. Since there is a growing volume of literature on processes of imitation and

modeling, research findings have much to say about ways in which modeling can be used as a significatn educational process. Much of the basic and applied research at the Center has focused upon the specification of conditions which enhance observational learning.

b. Discrimination Much of getting along in the contemporary world rests on one's ability to discriminate the important cues available in the environment. The processes by which children learn to recognize and respond to cues have not been formally incorporated in most teaching techniques. Cues can be used by the teacher to guide a child's behavior in a variety of significatn directions. The physical arrangement of the room, the kinds of questions the teacher asks, printed words, instructions, and facial expressions are but a few of the important sources of cues to which children must learn to respond. The processes of discrimination and the conditions under which children learn to discriminate have great implications for the classroom and the area has been an important one for the collaboration of research and instructional efforts.

c. Gratification It is clear that rewarding and gratifying experiences are crucial elements in the learning process. Reinforcement plays an important role in classroom procedures. In the Tucson Early Education Model classroom adults are trained in the technique of social reinforcement such as praise, attention, affection, and the like. Materials are chosen for the reinforcing value and activities are arranged so they naturally result in reinforcing events. In the instructional program it is intended that through multiple reinforcing experiences the child will come to regard learning as a satisfying experience and school as a source of significant and rewarding activities.

The ways in which reinforcement is distributed in the classroom and the contingent relationship of reinforcement to the behavioral goals of the instructional program have formed an important focus of the research activities.

2. Classroom Organization Variables

a. Individualization The general organization of the classroom is clearly related to the ways in which children learn what they learn and the efficiency with which they learn it. If learning is regarded to be a process by which one is provided appropriate models, taught to discriminate appropriate cues, and reinforced for particular behaviors, it is clear that it is necessary to be able to structure learning environments specifically for an individual child. Research tells us that children are different when they come to the educational environment, that they bring to school different sets of attitudes and different sets of skills, that they must begin their learning from different points in the educational process. It is clear that techniques must be developed to teach children "individually". Through the Follow Through Project at the Arizona Center a set of techniques for providing children behavioral options so that they may develop individual skills at individual rates has been under development. The organization of the classroom is predicted on the belief that it is not necessary for children to learn the same thing at the same time in order to profit from their educational experience. We have begun to develop and to research ways in which a classroom can be organized toward individualization and at the same time prepare the young child for integration into the broader culture.

b. Generalization One of the most serious criticisms of education today is that it is largely irrelevant. That is to say, many of the skills which a young child learns in the school have no relevance for him in his outside activities. It is an aim of the Tucson Early Education Model to build in transfer of skills from the educational to the natural environment of the child. The child must be able to extend his skills to a variety of settings, objects, and events. This principle has many implications for the development of teaching techniques and materials. By using materials from his own environment, by relating classroom experinece to home experiences, by teaching skills in a functional setting or in many different settings, skills can be extended across content areas both within and outside of the classroom.

3. The Principle of Orchestration

The various skills reflected in the four principle goal areas (language, intellectual base, motiviational base, and societal arts and skills) are seldom exercised independently of each other. Almost all intellectual activities of any relevance whatsoever require some combinations of these distinct behaviors. It is a central aspect of the Tucson Early Education Model that these skills are not taught separately one from another. This is a significant departure from the linear quality of traditional instructional method in which time segments are devoted to individual skills and in which the segments follow each other in repetitious fashion. It is an aim of the Tucson Early Education Model to develop techniques by which these skills can be taught in real and meaningful settings so the child learns how to integrate in a useful and relevant fashion the new behaviors he is

learning The relevance of the behaviors to life situations makes it possible for him to utilize the behaviors outside the school situation. This possibility results in added practice and much self-initiated work that is brought back into the school. The process of instructing in an integrated manner is called orchestration. It is hypothesized that orchestration promotes a broader use of intellectual skills in the child's natural world than does sequential skill acquisition.

IV. PROGRAMS OF RESEARCH

Initial research efforts conducted in the Arizona Center represented and attempt to study the effects of basic learning variables associated with the Tucson Early Education Model on child behavior. For example, some early work in the Center focused on the effects of modeling and discrimination on child behavior. As a result of these early studies and because of program development needs in the Tucson Early Education Model a formalized program of research was developed comprising three basic areas of study: intellectual skills, environmental influences on learning, and instructional methods and techniques.

Intellectual Skills

As indicated in Section III, one of the four goal areas of the Tucson EArly Education Model concerns the development of intellectual skills. Quite early the Arizona Center recognized the need for research in the intellectual

skills area. One of the major assumptions underlying the founding of the National Laboratory on Early Childhood Education was the view that intellectual competence could be modified through appropriate experiences. Research data reported by J. McV. Hunt, Benjamin Bloom and others in the early 1960's suggested that intervention to affect intellectual functioning should focus on the early years of life. Work at the Arizona Center was an effort to study those skills which potentially might affect academic performance. Early work in the Center focused on the area of sequential memory. Bergan, Zimmerman and Ferg (1971) studied the influence of variations in content and stimulus grouping on sequential memory. In this investigation three types of stimulus content were used: numerical, figural, and verbal. Single, double, and triple stimuli presentations were involved within each content dimension. Achievement and intelligence data were also included in the study. Factor analyses revealed two stimulus grouping factors which were labeled single stimulus and multiple stimuli groupings. The central conclusion gleaned from this study was that sequential memory ability is influenced by the manner in which stimuli are grouped. This suggested that what Jensen described as associative learning ability is determined not only by such variables as capacity of the memory storage system, but also by the influence of the manner in which stimuli are grouped for recall. Jensen (1969) argued that conceptual grouping and associative learning were both genetically determined abilities. This research study suggested the possibility that teaching children strategies for gouping stimuli for recall as, for example, organizing stimuli into rhythmic patterns could affect associative learning ability.

In an effort to investigate the relevance of intellectual skill research to the curriculum, the intellectual skills program launched a series of studies of competencies underlying reading progress. One early investigation in this area focused on the relationships between visual recognition of stimuli presented under backward masking conditions and reading ability. High correlations were found between ability to recognize verbal and numerical stimuli and performance on standardized reading tests. These strong relationships were observed in children tested in the first, third and fifth grades as well as in the performance of young adults (for research on adult subjects see Gilbert, 1959).

In a second study related to performance under backward masking conditions an attempt was made to train children by providing repeated exposure to stimuli presented under masking circumstances. Significant improvement was obtained for figural stimuli, however, no improvement occurred in training with verbal and numerical stimuli.

The final set of studies carried out under the intellectual skills program investigated the effects of identifying distinctive features of stimuli on letter recognition. Three studies were undertaken related to this topic. The first investigation dealt with the effects of varying types of pretraining on subsequent identification of letters. Four types of pretraining were employed: In a discrimination pretraining condition children were shown two letters and asked to specify whether they were the same or not the same. In a second condition children were asked to copy distinctive features of letters. In a third condition children were required to put letters together by manipulating a cardboard cutout representing a

distinctive feature. In a fourth condition children were taught to name distinctive features. In those conditions in which children were taught to name and put together letters performance was superior to that of a control group which received instruction in letter naming.

The second investigation related to distinctive features was an attempt to determine the effects of positional cues on the identification of letters and letter-like forms under response number and pretraining variations. Sets of stimuli which could be identified on the basis of positional cues in the vertical, horizontal and vertical and horizontal planes were used. An experimental group learned to label positions verbally during pretraining while a control group participated in a color naming task. Significant main effects confirmed an hypothesized influence of positional cue variations on perceptual learning. A significant interaction between positional cue and response number variations indicated that cue variations affected associative learning as evidenced by changes in degree of interference related to increasing number of responses made in a stimulus set.

The final study in this series dealt with the influence of verbal pretraining on letter identification under variations in the number of responses made to stimuli in a set. Children receiving verbal pretraining learned to label positional cues in letters subsequently to be identified. Children in a control condition participated in a color naming task. One set of existing hypotheses suggests that pretraining affects perceptual learning. Another set suggests that pretraining influences the acquisition of associations to stimuli. Significant main effects supported hypothesized verbal pretraining influences on perceptual learning.

The practical importance of the studies on intellectual skills derived from the possibility of training children in skills which would facilitate academic performance in reading. Results from the three studies dealing with pretraining were implemented in the Follow Through Program through the Psychological Services Component of the Tucson Early Education Model. Children having difficulty learning to identify letters were taught to label distinctive features of the letters. Field data indicated that such training could be beneficial in assisting children to acquire skills in letter identification.

Environmental Influences on Learning

The efforts of the Arizona Center to research and develop a total educational program for young children extended to several investigations of the environment operating from outside the schoolroom which influence children's school performance.

During the first two years of the Center's activities one major objective of the research in this area was to provide an accurate sociological description of the target populations of compensatory education programs, particularly the socio-cultural characteristics of children attending the Tucson Ealry Education Program. Since compensatory programs are frequently developed on the basis of stereotyped assumptions about the nature of "disadvantaged"populations, the desire to avoid this possible overgeneralization required the collection of data on the similarities and differences among groups served by a specific compensatory education program. This objective was met in the population description report prepared by Dr. I. Roger Yoshino and his co-workers in April, 1968.

Two other substudies lead to the identification of sociological factors which contribute to cultural stability or to acculturation among the Mexican-Americans of Tucson, Arizona. The results of these studies were reported in two papers. The first was a paper completed in April, 1968 by Allyn Spence: "Variables Contributing to the Maintenance of Mexican-American Social Structure in Tucson". The second was a report entitled "Pluralism and the Family: The Public and Private Worlds of the Tucson Mexican-American" presented at the Rocky Mountain Social Science Association Conference in May, 1969.

An additional goal of the research on socio-cultural influences was to determine the relationship among characteristics of the Mexican-American subcluture, and success in school. The work toward this goal resulted in the following papers:

Yoshino, Roger, et al, Sociocultural Characteristics and Educational Achievement of Mexican-Americans, (Advance Report) ACEDE Report,1969.

Yoshino, Roger, et al, Cultural Pluralism and Educational Achievement Among Mexicanos of Tucson's Barrios, presented at the 1968 Convention of the American Anthropological Association.

Yoshino, Roger, et al, Educational Achievement and Sociocultural Characteristics of Mexican-Americans, a population description report.

Yoshino, Roger and Garcia, Angela, The Mexican-American Family and Intellectual Achievement, presented at the 1969 meetings of the American Sociological Association.

It had been hoped that this socio-cultural information would permit the development of more relevant and appropriate educational plans for the children attending TEEM classrooms and would suggest means to increase their parents' participation in the schools. Due primarily to the lack of funds and personnel with appropriate training and motivation, this hope was not realized as a result of this particular set of studies.

A different approach to the identification of environmental factors which are related to intellectual development and academic achievement was taken by Ronald Henderson. Starting from the work of Dáve and Wolf, he undertook the development of measures of socialization practices which might influence intellectual performance. The environmental measures differentiated sharply between groups of Mexican-American first graders who performed well or poorly on criterion measures (Henderson and Merritt, 1968). A follow up investigation demonstrated that environmental measures provided good prediction of school achievement three years later (Henderson, 1972).

This research led to the effort to develop a more efficient and economical measurement of environmental characteristics. Pilot testing conducted in 1969-70 toward this end permitted the refinement of hypothetical variables through factor analysis and revealed that the pilot instruments yielded good predictions of intellectual performance (Henderson, 1970). Further research on these instruments led to the development and preliminary validation of the Henderson Environmental Learning Process Scale (Henderson, Bergan and Hurt, 1972).

A major goal of this research on home characteristics and intellectual development involved the collection of data which could guide the development and evoluation of a program to help parents to provide more intellectually

stimulating environments for their children. The framework for such a program was developed (Henderson, 1970) and made available to the Parent Invovlement Component of the Tucson Early Education Model but again, its utilization for the development of a specific program was hampered by insufficient funds, lack of personnel and a non-nuturant socio-political ambience.

This research on environmental variables and intellectual performance identified factors which were related to academic achievement. However, since the relationships might not be causal, the next step required was applied experimentation which attempted to modify one aspect of the home to produce a change on some specific intellectual function. Thus, a research project was undertaken to test the effect of a short parent training program on the question-asking behavior of the children. The study showed conclusively that the training strategies developed effectively changed the child's environment so as to modify a particular aspect of his intellectual performance.

This last study resulted in the following reports:

Henderson, R. W., Intellectual Skill Learning in the Home Environment: An Interim Research Report, November, 1971.

Henderson, R. W. and Garcia, A. B., The Effects of a Parent-Training Program on the Question-Asking Behavior of Mexican-American Children, January , 1972.

Garcia, A. B., Hoffman, H., and Lauritsen, E., Description of a Program to Train Parents to Influence the Development of Question-Asking Skills in Their Young Children, January, 1972.

The information and experience accrued from this project subsequently

permited a more knowledgeable review of other parent training programs toward the end of specifying guidelines for the development of a prototypic family education program. The results of this review are reported in "The Arizona Family Instructional Program: Guidelines for Development of a Prototypic Home Training Program" in May, 1972.

With the work for this last report completed, which included the examination of the oldest and most successful home intervention programs in the country, Arizona personnel had acquired the requisite knowledge to begin the specification of a comprehensive home training program and were ready to 1) identify and implement the most effective strategies for a total family instructional program; 2) to begin the articulation of a hierarchy of intellectual, academic, and social skills which could provide some of the objectives for the family instruction program; and 3) to begin the piloting of a formal system to train "disadvantaged" families to gain control of their own lives through the knowledgeable management of their home environments by acquiring the skills to determine their own family and personal goals and to knowledgeably employ efficient techniques of social management to modify their environments to achieve those goals , rather than those determined by school personnel.

Instructional Method and Technique

Although the paradigmatic effect of teacher behavior has long been assumed, there has been little systematic study of such modeling variables until recently. Educators have long held particular interest in student acquisition of cognitive behavior. However, because of the paucity of social

learning research dealing with cognitive behavior, there is little prescription for teacher modeling behavior. At present, modeling procedures are loosely and intuitively applied by the practitioner. Little attention has been directed at quantifying imitative responding by the child and hence precise specification of the variable parameters is precluded. At present, then, teachers lack a formal feedback mechanism by which to alter their modeling performance. Such alterations presently remain the product of each teacher's experience and are not generally drawn from a common body of knowledge. Clearly there exists a need to provide the teacher with more prescriptive guidelines by which to define his role as model. This level of detail in role specification can be provided through a program of social learning research.

To meet this need for acquiring greater specificity concerning the role of modeling in cognitive behavior, Zimmerman and Rosenthal and associates have undertaken during the past three years an intensive study of the modeling process. This body of research has been directed at a variety of cognitive skills and at a variety of age groups. Rosenthal, Zimmerman and Durning (1970) have shown that abstract classes of question formulation could be vicariously induced and generalized from the performance of an adult model by disadvantaged Mexican-American children. The power of the social learning procedure was evident from the rapidity of learning (less than ten minutesoof training) and from the similar magnitude of effects observed in the four distinct question classes. This study also revealed that only a small fraction of the imitative responding could be attributable to exact copying. The previous conceptions of the imitation process as literal reproduction or slavish copying clearly underestimate the potentiality

of social procedures in complex situations. Rosenthal and Zimmerman (1971a) replicated this study and found that instructions of varying degrees of specificity added little to the power of observational learning for inducing an abstract response. In addition, expectancy-to-succeed-set also failed to influence acquisition. Rosenthal and Zimmerman (1971b) demonstrated that observational learning procedures were effective in inducing Piagetian conservation in a variety of dimensions and were effective in facilitating transfer to novel simulus instances. In addition, the provision of a rule by the experimenter facilitated acquisition. Reinforcement to the model failed to influence responding. The children thus trained varied in age from four to seven years and the training procedures were brief. When compared to a traditional didactic approach, modeling procedures facilitated acquisition and generalization while the didactic procedure failed to influence performance. Zimmerman and Rosenthal (1971a) demonstrated the retention and delayed generalization of a rule-governed response over a seven week period. In this investigation, rule provision prior to the model's performance enhanced observational learning, generalization and retention. In another investigation, Zimmerman and Rosenthal (1971b) found that if the rule is presented continuously (and repetitively) during the model's performance there is further enhancement of performance over rule provision before the model's performance. Further, feedback to the observer during his performance (subsequent to the model's performance) facilitated acquisition and generalization. These effects, which were based on an extremely complex rule learning task, were obtained with Mexican-American children as well as Anglo-American children. Zimmerman and Pike (1971) found that modeling procedures, when coupled with reinforcement procedures,

significantly enhanced acquisition and transfer of question-asking behavior of second grade Mexican-American children when compared to reinforcement procedures alone or control group responding. This study was carried out over an extended period of time and utilized a small group instructional arrangement. This study demonstrated that experimental social learning procedures and the conclusions derived therefrom, can be directly translated to a prototypic classroom situation without necessitating theoretical alterations or special equipment.

The above studies offer extensive information concerning the power and versatility of observational learning procedures in promoting the acquisition, the generalization--both immediate and after delay, and the retention of a wide variety of conceptual responses in young children. The final study in particular demonstrated the instructional utility of these experimental findings. Although there is a substantial amount of research demonstrating the effects of a model on a wide variety of affective, self-regulatory and motor behavior (Bandura, 1969), little attention has been directed towards issues of abstraction or concept formation; the above studies are the first research focused on these issues. It is important, then, to continue to direct sustained effort toward the development of a body of social learning principles and to translate these principles into a viable theory of instruction. This theory of instruction will be organized and presented in the proposed manual for observational learning. The integration of research and the instructional manual is presented below.

The last six month of the 1972 FY will be used to phase out on-going research efforts with elementary school children. A major review of the

current literature on modeling-imitation processes will be conducted. From this review, we will propose a conceptual model to summarize these findings. This model will also serve as a basis for selecting variables to be studied and as the basis for organizing this program of research. It will commence during FY 1973. A timetable and a preliminary outline for the development of a manual describing procedures for the use of observational learning techniques will also be submitted.

During FY 1973, the proposed program of research will be undertaken. In addition, a preliminary rough-draft version of the observational learning manual will be completed. During FY 1974, our program of research with toddler-aged children will continue. During this period, a final version of the observational learning manual will be drafted. During the 1975 FY this manual will be evaluated in various applied settings to establish its suitability for use by practitioners.

These, then, are the projected research and development activities of the Observational Learning Project for the June 1, 1972 through November 30, 1972 funding period. In addition, the general scope of our three-year effort was briefly outlined. The final project of these efforts, in addition to individual research studies, will be a practical manual for the utilization of observational learning procedures with young children.

V. RESEARCH PRACTICE INTERACTION

A continuing concern of the Arizona Center for Early Childhood Education has been to develop ways of bringing about a closer articulation between basic and applied research and educational practice. In 1968 the Arizona Center for Early Childhood Education was funded as a program sponsor for the National Follow Through Planned Variation Program. The basic responsibility of a Follow Through Sponsor is to provide training and services, together with program evaluation activities, to enable local communities to implement a given educational model. This project resulted in part from the program development efforts which were conducted under the auspices of the National Laboratory for Early Childhood Education. The funding of this Follow Through Project at the Arizona Center for Early Childhood Education was seized upon as an opportunity to develop dissemination strategies which would facilitate the influence of the scientific knowledge base from the field of psychology upon educational practice. It was also anticipated that practical problems encountered in the implementation of an educational model would influence the nature of psychological and educational research which would be conducted at the Center. In 1970 an effort was made to consolidate the research activities sponsored by the National Program on Early Childhood Education and the Follow Through Project under a single administrative organization. It was hoped that this effort to organize the Center on the basis of function, rather than on the basis of source of funding, would enable personnel at the Center to bring about a maximum interaction between research and practice. The new organizational framework included a research branch and a training branch. This strategy seemed to be a reasonable approach to the problem of bringing the several resources of the organization to bear upon this effort

to integrate research and practice. For example, if basic research relating to instruction through modeling procedures were to suggest a major change in the nature of the educational model supported by Follow Through, it may not be appropriate to make a sudden change in the nature of the educational program since the Follow Through Planned Variation Project was established as a research program intended to compare and contrast different approaches to early childhood education. The Follow Through Program provided a unique and beneficial opportunity to explore procedures for integrating research into the practical concerns of operating an educational program. However, insofar as the Follow Through Program represented an attempt to examine the effectiveness of a variety of clearly specified predetermined educational programs there were some limitations in the extent to which research could be allowed to influence practice during the planned variation proportion of the Follow Through experiment. Therefore, it was deemed advisable to extend efforts in research practice interaction beyond the Follow Through Program. Accordingly, a new educational model was planned for development under the auspices of the National Program for Early Childhood Education.

Early Elementary Program Development

In initial efforts toward the development of an early childhood education program which would permit maximal influence of research in educational practice,a series of position papers were written. These papers were divided into three categories: those concerned with curriculum content in the area of reading, language development, and mathematics, a paper dealing

with the development of guidelines of parent/child training and a set paper on educational decision making.

Evaluation of Curriculum Materials Appropriate to Open Classrooms

Characteristics of the open classroom approach include the self-selection by students of exciting learning experience. However, many of the classroom environments do not seem to incorporate the necessary settings for the acquisition of specific skills. Evidence seems to indicate that these specific skills are essential ingredients of any primary educational program, particularly those of reaing, language and mathematics. Too often the introduction and success of these skills are left to the individual teacher to develop and implement. This is a formidable task for teachers who have also been given the burden of providing multiple learning activities each day. The problem is to incorporate existing curriculum materials which emphasize skill acquisition into the open classroom environment in such a way that there is minimum violation of the spirit and design of that environment. Criteria for the selection of those curricula must include effectiveness based on evaluation data with the appropriate populations and adaptable for use in individual or small group settings. Optional materials and techniques must be available to meet the needs of individual students.

In order to identify appropriate materials for use in the early education model proposed for adoption under the National Program auspices a review of the literature in the area of reading, language and mathematics was conducted. The review of literature included an examination of a limited number of programs selected for their compatibility with open classrooms. In addition, research literature providing empirical support for various

practices in language, mathematics and reading were included in the review. The interested reader may attain copies of these reports from the Arizona Center for Educational Research and Development. The report on reading is entitled "The Application of Recent Research on the Evaluation of Reading Programs", the one on mathematics is similarly named "The Application of Research on the Evaluation of Mathematics Programs", and the report on language is "The Application of Research to the Evaluation of Language Programs".

The Development of Guidelines for Parent/Child Training

Numerous research studies have revealed that the kinds of experiences which a child has in his home environment influence his performance in school. Evidence indicates that the home environment contributes more to the variance in academic performance than does the quality of the school program. Researchers in the area have asserted that while certain preschool programs may effectively prevent the progressive educational retardation characteristics of certain student populations,this effectiveness is transitory, and that "unless the home circumstances of the child be changed, the adverse environment which created the original problem will continue to take its toll."[1] It is now a widely accepted point of view that effective educational programs must incorporate procedures for working with parents to enable them to become more effective agents of socialization for their children. Efforts to prevent the traditional academic failure experienced by many poverty and minority students have sponsored varied compensatory education programs. Few, however,

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1. Gray, Susan, Home Visiting Programs for Parents of Young Children, DARCEE Papers and Reports, Vol. 5, No. 4, 1961.

have evolved a program which reaches the parent, the most potent and lasting educator which these children will have. The problem then was seen as one of developing a parent program capable of training parents to become effective educational change agents for their children one which could afford parents the power to bolster and expand the education their children receive during the primary school years.

The first step in the development of guidelines for such a program was a review of theoretical, experimental, and applied literature on the effects of parent behavior on the development of intellectual social skills in young children. This effort included the examination and evaluation of procedures, handbooks, equipment, evaluation procedures and other materials used in existing home intervention programs. An attempt was made to identify the most promising intervention programs, and on site observations of the most promising programs were conducted in order to gain first hand operational knowledge of the procedures which might be adapted for use in the development of our parent/child training program. Next, there was an effort to articulate a rationale and conceptual scheme for the development of a parent/child training program.

A major conclusion of this work was that existing programs which intervene in the home appear to view the socialization process as a uni-dimensional influence in which the parent shapes the child's behavior and assists him in the development of specific skills. In existing programs there was no evidence of recognition of the fact that children also exert an influence on the adults in their environment. A unique characteristic of the guidelines which were developed as an outcome of this activity is the attention given to a multi-dimensional influence model.

Models for Educational Decision Making

As part of the effort to gear up the implementation of an early childhood education model under the auspices of the National Program on Early Childhood Education an effort was undertaken to review models for educational decision making and to make recommendations of the adoption of a model which might prove suitable for implementation by the National Program. The work on decision making included a review of decision-making processes in a number of innovative elementary school programs currently in operation in local school districts as well as a consideration of decision-making models which had been articulated to broad scale efforts to improve instruction.

With respect to local programs, a number of conclusions were drawn: First of all, it was found that there was a marked change in the role of teacher in the decision-making process with respect to operations. In some cases teachers were expected to implement programs designed by administrators. In other systems teachers were given some voice in the determination of program objectives and procedures.

The second conclusion was that in the limited sample of programs studied for this report little attention was given to the task of involving students and parents in decision making activities. In no case was there a formalized program to develop self-directed learning skills in students, nor with the exception of one program was there a systematic mechanism for obtaining input from parents. A third finding was the lack of specification of the manner in which program operations were related to program finances. The above conclusions point clearly to the need for the development of activities designed to construct decision-making models which can be used in innovative programs.

Two broad scale programs for individualized instruction were reviewed in Project PLAN (Programs of Learning in Accordance with Needs) and IPI (Individually Prescribed Instruction). In PLAN decision making is implemented at the classroom level. One limitation to PLAN is that there is no decision making on the programs management level. There is no real control by the principal or superintendent over his own program. For example, there is no way to relate classroom needs with program budgetary planning. PLAN provides a limited amount of teacher control, but teachers are not provided with training in and an opportunity to apply psychological principles in instruction. The teaching/learning units which form the core of instruction are preestablished and there is only minimal opportunity for teachers to intervene through the application of psychological principles in instruction.

PLAN also does not provide a way to evaluate teacher effectiveness or to allow the teacher to evaluate his own success in the classroom. PLAN also lacks some flexibility as there is no way to operate but to accept course outlines as specified by PLAN. PLAN does a rather thorough job of presenting a basic academic curriculum but a teacher does not have much liberty to alter the curriculum. Furthermore, there is no provision for PLAN for hypothesis testing in the classroom setting. If a student does not achieve a goal, he is directed to another teaching/learning unit or to review his previous unit, but there is no attempt to find out why he did not achieve his goal. A final drawback to PLAN is that it is rather unwieldy and expensive. In order to be able to use any of PLAN's principles or materials one must buy the whole system.

The decision-making process in IPI is based on a computer management system. The system contains a data bank which consists of much information on each individual student such as criteria of competence, the student's background, how an individual student proceeds in his learning, whether he is fast or slow, attentive or inattentive, etc., the instructional means available for teaching certain objectives and other such data needed for each student. The computer management system collects and processes the data for each student and supplies the information to the teacher in summarized form such that it assists in her decison making. The computer does not make the instructional decisions, but provides decision tables to the teacher, and the student, in order to assist in their decision making for each individual student. IPI like PLAN is a successful attempt to integrate decision-making, systems analysis and the educational process on the classroom level. It too has no provision for relating the classroom to the programs management level. IPI seems a little more flexible than PLAN in that the teacher has more input into the instructional program and is allowed a little more freedom in the decision-making process itself.

IPI provides for some teacher evaluation through the continuous training program in which a monitor systematically gathers data about the teachers and in a "non-judgemental way" feeds this data back to the teachers. The information is used to develop strategies for use in teacher planning sessions in which they continue their training.

The teacher training program does not emphasize instruction in the application of psychological principles, i. e., the emphasis is placed on instructional content. As in PLAN, a student having difficulty reaching an objective in IPI would have no assistance in finding out why he was having

difficulty, but would be instructed to review his lessons or would be tutored in the content area by the teacher.

The CIPP (Context, Input, Process and Product) Model developed by Stufflebeam and Guba provides an example of decision making related to the evaluation of educational programs. The CIPP Model provides a useful means for implementing decision-making processes at administrative levels. However, this approach does not provide a mechanism for students, parents and teachers to have input into instructional decision making. Nor does it articulate decision-making processes made in programs management to decision making carried on at the classroom level.

The analytical instructional model,which was the final model reviewed in the Center work on decision making,deals with the issue of articulation of decision making involving students, parents, teachers and administrators. The rudiments of the analytic approach were set forth by Bergan (1970). Detailed descriptions of the applications of the approach in dealing with educational decision making concerning problems exhibited by children receiving psychological services were given by Bergan and Curry (1970) and Bergan, et al (1971). A detailed account of applications in describing potential applications of the model in a variety of educational settings has been presented by Bergan and Dunn (in press).

Within the analytical instructional model (AIM), educational activities, in whatever settings they may occur, are conceived as problem solving tasks requiring the selection, implementation and validation of strategies for attaining instructional goals. The model is analtyic in that it separates potential determinants of goal attainment into component parts so that they may be examined. The aim of analysis is to specify goal determinants in order

to identify and implement strategies which may facilitate goal attainment. The analytic instructional model is an outgrowth of the general systems concept. "Within analytic instruction the educational setting within which a problem occurs is considered as an open system involving interrelated components which operate to produce stated objectives" (Bergan and Dunn, in press).

The decision-making process as conceived within analtyic instruction occurs in four stages: problem identification, problem analysis, intervention and evaluation (Bergan, 1970).

The purpose of problem identification within analytic instruction is to identify educational needs. Problem identification may invovle attempts to identify specific learner needs within a classroom setting, or it may include the determination of program needs for large groups of children within a school system.

Problem analysis is an attempt to specify the factors effecting problem solution, the identification of strategies, with the potential for achieving solution, and the specification of a plan selected from a consideration of alternative courses of action designed to lead to problem solution. Problem analysis at the classroom level involves the delineation of behavioral capabilities (i.e., skills and abilities) and environmental determinants which might directly affect behavior relevant to problem solution. Problem analysis in programs management settings requires consideration of factors related to the attainment of overall program goals in addition to those variables such as cost, equipment, allocation of personnel, etc.

During intervention, plans devised in problem analysis are implemented. Intervention in face to face instructional settings requires implementation of procedures designed to assist students to achieve specific instructional goals specified during problem identification. Programs management intervention typically involves a change in an entire instructional program or set of programs.

Evaluation occurs during all phases of analytic instruction. It is useful to give special recognition to evaluation efforts designed to determine whether goals set forth in problem identification have been attained and whether or not procedures designed to attain instructional objectives have been effective. Most of the existing decision-making systems fail to link evaluation to analysis. A unique feature of the analytic instructional model is that it links evaluation to analysis by permitting hypothesis testing within classroom and programs management work.

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Footnote

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